

REMARKS

Claims 1, 4, 6-15 and 17-25 are pending in this application. Claims 10-13 have been withdrawn from consideration.

Reconsideration and allowance in view of the following remarks are respectfully requested.

Claim Rejections – 35 U.S.C. § 102

Claims 1 and 4 were rejected under 35 U.S.C. § 102(b) as being anticipated by Li et al. (US patent No. 5,772,771).

Claim 1 has been amended to recite “an inlet port from which a reactant gas is introduced... an outlet port provided to said annular gas passage, said outlet port being spaced apart from said inlet port.” Applicants submit that by providing an outlet port to the annular gas passage, the outlet port being spaced apart from the inlet port, any undesired particulates including a water component can be removed from the annular gas passage more efficiently. For example, the annular gas passage can be purged with an inert gas such as argon by introducing the argon through the inlet port and drawing the argon with a vacuum pump through the outlet port which is spaced apart from the inlet port, i.e. located away from the inlet port.

In contrast, Li et al. merely introduces gas to manifold 36 through a common gas feed line, i.e., “inlet port” 80. The manifold 36 of Li et al. is not provided with spaced inlet and outlet ports. The cleaning gas line 82 (which the Examiner characterizes as being an outlet port) is merely connected, via flow control valve 86 and shut-off valve 88, to common gas feed line 80 (inlet port) and is not provided to the annular gas passage 36. In Li et al., the gas in manifold 36 is evacuated via the inlet port 80. Therefore, in Li et al. the gas is evacuated from the manifold 36 (annular gas passage) through the same port the gas is introduced to the manifold, i.e. inlet port 80.

Consequently, Li et al. does not disclose, teach or suggest the subject matter recited in claim 1. Therefore, Applicants respectfully submit that claim 1, and claim 4 which depends from claim 1, are patentable, and respectfully request that the rejection of claims 1 and 4 under § 102(b) be withdrawn.

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Claim Rejections – 35 U.S.C. § 103

Claims 6-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Li et al. in view of Tomoyasu et al. (US Pat. No. 5,900,103).

Claims 6 and 7 depend directly or indirectly from claim 1. Tomoyasu et al. does not cure the deficiencies of Li et al. discussed above with respect to claim 1. Therefore, for at least the reasons provided above with respect to claim 1, Applicants respectfully submit that claims 6 and 7 are patentable over Li et al.

Tomoyasu et al. does not disclose, teach or suggest an annular gas passage, the annular gas passage having a plurality of nozzles through which the reactant gas is introduced into the process chamber. Indeed, Tomoyasu et al. merely discloses an upper electrode 730 in Figure 35 which serves as a plasma generator electrode and also as a process gas introducing passage. The electrode 730 of Tomoyasu et al. is a hollow aluminum-made “plate-like” electrode provided with a plurality of apertures 730a in its bottom (see col. 17, lines 1-4 in Tomoyasu et al.). Furthermore, referring to Figure 37, Tomoyasu et al. discloses “a plate-like” vaporizer 732A which is made integral to an upper electrode 730A. Its housing 742A has a plurality of apertures 772 leading to intermediate chamber 770 in the upper electrode 730A (see, col. 18, lines 10-25). Moreover, contrary to Examiner’s contention, the volume 770 is merely an intermediate chamber and is not an annular gas passage. Consequently, Tomoyasu et al. does not disclose, teach or suggest, *inter-alia*, “an annular gas passage..., said annular gas passage having a plurality of nozzles through which the reactant gas is introduced into said process chamber,” as recited in claim 1. Therefore, for at least the above reasons, Applicants respectfully submit that neither Li et al. nor Tomoyasu et al., alone or in combination disclose, teach or suggest the subject matter recited in claims 6 and 7

Therefore, Applicants respectfully submit that claims 6 and 7 are patentable, and respectfully request that the rejection of claims 6 and 7 under § 103(a) be withdrawn.

Claims 14-15, 21 and 24-25 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Li et al. (US Pat. No. 5,772,771).

Claims 21, 24 and 25 depend directly or indirectly from claim 1. Therefore, for at least the reasons provided above with regard to claim 1, Applicants respectfully submit that claims 21, 24 and 25 are patentable over Li et al.

Claim 14 has been amended to recite “an inlet port from which a reactant gas is introduced...an outlet port provided to said annular gas passage, said outlet port being spaced

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apart from said inlet port.” Applicants submit that by providing an outlet port to the annular gas passage, the outlet port being spaced apart from the inlet port, any undesired particulates including a water component can be removed from the annular gas passage more efficiently. For example, the annular gas passage can be purged with an inert gas such as argon by introducing the argon through the inlet port and drawing the argon with a vacuum pump through the outlet port which is spaced apart from the inlet port, i.e. located away from the inlet port.

In contrast, Li et al. merely introduces gas to manifold 36 through a common gas feed line, i.e., “inlet port” 80. The manifold 36 of Li et al. is not provided with spaced inlet and outlet ports. The cleaning gas line 82 (which the Examiner characterizes as being an outlet port) is merely connected, via flow control valve 86 and shut-off valve 88, to common gas feed line 80 (inlet port) and is not provided to the annular gas passage 36. In Li et al., the gas in manifold 36 is evacuated via the inlet port 80. Therefore, in Li et al. the gas is evacuated from the manifold 36 (annular gas passage) through the same port the gas is introduced to the manifold, i.e. inlet port 80.

Consequently, Li et al. does not disclose, teach or suggest the subject matter recited in claim 14. Therefore, Applicants respectfully submit that claims 14, and claim 15 which depends from claim 14, are patentable. Thus, Applicants respectfully request that the rejection of claims 14-15, 21, 24 and 25 under § 103(a) be withdrawn.

Claims 17 and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Li et al. (US Pat. No. 5,772,771) and further in view of Tomoyasu et al..

Claims 17 and 18 depend directly or indirectly from claim 14. Tomoyasu et al. does not cure the deficiencies of Li et al. discussed above with respect to claim 14. Therefore, for at least the reasons presented above with regard to claim 14, Applicants respectfully submit that claims 17 and 18 are patentable over Li et al. and Tomoyasu et al., taken individually or in combination.

Therefore, Applicants respectfully request that the rejection of claims 17 and 18 under § 103(a) be withdrawn.

Claims 22 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Li et al. (US Pat. No. 5,772,771) and further in view of Suzuki et al. (U.S. Patent No. 5,522,934).

Claims 22 and 23 depend directly or indirectly from claim 1. Suzuki *et al.* does not cure the deficiencies of Li *et al.* discussed above with respect to claim 1. Therefore, for at least the reasons presented above with regard to claim 1, Applicants respectfully submit that claims 22 and 23 are patentable over Li *et al.* Furthermore, the Examiner concedes that Li *et al.* does not disclose that the gas injecting part comprises a gas inlet port from which the discharge gas is supplied, an annular passage connected to the inlet port and having a plurality of circumferentially arranged nozzles through which the discharge gas is introduced into the processing chamber and an outlet port provided to the annular gas passage so that a third vacuum pump is connected thereto.

Suzuki *et al.* merely discloses a plasma apparatus including a plurality of gas supply nozzles. The gas supplying nozzles of Suzuki *et al.* have process injection holes formed at a plurality of levels in a process chamber of the plasma apparatus. The holes located at an upper level are closer to a center of a target surface than gas injection holes located at a lower level. However, Suzuki does not disclose, teach or suggest an annular gas passage connected to the inlet port so that the reactant gas supplied from the inlet port is supplied to the plurality of nozzles by flowing through the annular gas passage.

Moreover, contrary to Examiner's contention, there is no suggestion in either Li *et al.* or Suzuki *et al.* to combine the teachings of Li *et al.* and Suzuki *et al.* to modify the apparatus of Li *et al.* to comprise the gas injection structure of Suzuki *et al.*

Consequently, for at least the above reasons, Applicants respectfully submit that neither Li *et al.* nor Suzuki *et al.*, alone or in combination, disclose, teach or suggest the subject matter recited in claims 22 and 23.

Therefore, Applicants respectfully request that the rejection of claims 22 and 23 under § 103(a) be withdrawn.

Claims 1, 4, 6-7, 15-15 and 17-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tomoyasu *et al.* in view of Li *et al.*

The Examiner concedes that Tomoyasu *et al.* does not disclose an annular gas passage having a plurality of nozzles. The Examiner relies on Li *et al.* and contends that Li *et al.* discloses a gas introducing structure comprising an inlet port in a sidewall of the chamber connected to an annular gas passage 36, the annular gas passage having a plurality of circumferentially arranged nozzles 34, a valve 78 to isolate the chamber from the gas source, and an outlet port 82 provided to the gas passage and comprising a vacuum pump 84 to

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evacuate the reactant gas. The Examiner contends that it would have been obvious to one of ordinary skill in the art to modify the apparatus of Tomoyasu to include the gas introducing structure of Li et al. Applicants respectfully disagree.

As stated above, Li et al. merely introduces gas to manifold 36 through a common gas feed line, i.e., "inlet port" 80. The manifold 36 of Li et al. is not provided with spaced inlet and outlet ports. The cleaning gas line 82 (which the Examiner characterizes as being an outlet port) is merely connected, via flow control valve 86 and shut-off valve 88, to common gas feed line 80 (inlet port) and is not provided to the annular gas passage 36. In Li et al., the gas in manifold 36 is evacuated via the inlet port 80. Therefore, in Li et al. the gas is evacuated from the manifold 36 (annular gas passage) through the same port the gas is introduced to the manifold, i.e. inlet port 80.

Consequently, neither Li et al. nor Tomoyasu et al., alone or in combination, disclose, teach or suggest the subject matter recited in claims 1 and 14. Therefore, Applicants respectfully submit that claims 1 and 14, and claims 4, 6-7, 15, 17 and 18 which depend directly or indirectly from either claim 1 or claim 14, are patentable. Thus, Applicants respectfully request that the rejection of claims 1, 4, 6, 7, 14, 15, 17 and 18 under § 103(a) be withdrawn.

Claims 21-25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tomoyasu et al. in view of Li et al. and further in view of Suzuki et al.

Claims 21-25 depend, directly or indirectly, from claim 1. Suzuki et al. does not cure the deficiencies of Tomoyasu et al. and Li et al. discussed above with respect to claim 1. Therefore for at least the reasons provided above with regard to claim 1, Applicants respectfully submit that claims 21-25 are patentable over Tomoyasu et al. and Li et al., taken alone or in combination.

Furthermore, the Examiner concedes that Tomoyasu et al. and Li et al. do not disclose that a gas injecting part comprising a gas inlet port from which the discharge gas is supplied and being incorporated into a sidewall of the chamber, an annular passage connected to the inlet port and having a plurality of circumferentially arranged nozzles through which the discharge gas is introduced into the processing chamber, and an outlet port provided to the annular gas passage so that a third vacuum pump is connected thereto.

Suzuki et al. merely discloses a plasma apparatus including a plurality of gas supply nozzles. The gas supplying nozzles of Suzuki et al. have process injection holes formed at a

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plurality of levels in a process chamber of the plasma apparatus. The holes located at an upper level are closer to a center of a target surface than gas injection holes located at a lower level. However, Suzuki does not disclose, teach or suggest an annular gas passage connected to the inlet port so that the reactant gas supplied from the inlet port is supplied to the plurality of nozzles by flowing through the annular gas passage and where an outlet port is provided to said annular gas passage, the outlet port being spaced apart from said inlet port, as recited in claims 1 and 14.

Moreover, contrary to Examiner's contention, there is no suggestion in either Li *et al.*, Tomoyasu *et al.* or Suzuki *et al.* to combine the teachings of Li *et al.*, Tomoyasu *et al.* and Suzuki *et al.* and to modify the apparatus of Tomoyasu *et al.* to comprise the gas injection structure of Suzuki *et al.*

Consequently, for at least the above reasons, Applicants respectfully submit that none of Li *et al.*, Tomoyasu *et al.* or Suzuki *et al.*, alone or in combination, disclose, teach or suggest the subject matter recited in claims 21-25.

Therefore, Applicants respectfully request that the rejection of claims 21-25 under § 103(a) be withdrawn.

Claims 1, 4, 6-9, 14-15 and 17-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tei *et al.* (2002/0011215A1) in view of Tomoyasu *et al.* and further in view of Li *et al.*

As admitted in the Office Action, Tei *et al.* fails to disclose an annular gas passage having a plurality of nozzles, a valve disposed between the inlet port and the annular gas passage, an outlet port connected to the gas passage so as to evacuate the reactant gas from said gas passage, and a second pump connected to the outlet port.

As stated above, Tomoyasu *et al.* does not disclose teach or suggest an annular gas passage connected to the inlet port so that the reactant gas supplied from the inlet port is supplied to the plurality of nozzles by flowing through the annular gas passage and an outlet port is provided to the annular gas passage, the outlet port being spaced apart from the inlet port, as recited in claims 1 and 14.

Similarly, as stated above Li *et al.* does not disclose, teach or suggest an annular gas passage connected to the inlet port so that the reactant gas supplied from the inlet port is supplied to the plurality of nozzles by flowing through the annular gas passage and an outlet

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port is provided to the annular gas passage, the outlet port being spaced apart from the inlet port, as recited in claims 1 and 14.

Furthermore, there is no suggestion in either Tei et al., Tomoyasu et al. or Li et al. to combine the teachings of Tei et al., Tomoyasu et al. and Li et al. and to modify the apparatus of Tei et al. to include the gas injection structure of Li et al.

Consequently, for at least the above reasons, Applicants respectfully submit that none of Tei et al., Tomoyasu et al. or Li et al., alone or in combination, disclose, teach or suggest the subject matter recited in claims 1 and 14.

Therefore, Applicants respectfully submit that claims 1 and 14, and claims 4, 6-9, 15 and 17-20 which depend directly or indirectly from either claim 1 or claim 14, are patentable and request that the rejection of claims 1, 4, 6-9, 14-15 and 17-20 under § 103(a) be withdrawn.

Claims 21-25 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Tei et al. (2002/0011215 A1) in view of Tomoyasu et al. or Li et al. and further in view of Suzuki et al.

Claims 21-25 depend directly or indirectly from claim 1. Therefore, Applicants respectfully submit that claims 21-25 are patentable for at least the reasons provided above with regard to claim 1. Thus, Applicants respectfully request that the rejection of claims 21-25 under § 103(a) be withdrawn.


CONCLUSION

In view of the foregoing, the claims are now in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,

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